

Glanders

Droes, Farcy, Malleus

Importance

Glanders is a highly contagious, potentially fatal zoonotic disease of horses, donkeys, and mules.

Etiology

Glanders is caused by the bacteria *Burkholderia mallei*, previously known as *Pseudomonas*, *Pfeifferella*, *Loefflerella*, *Malleomyces*, *Actinobacillus*, *Corynebacterium*, *Mycobacterium* and *Bacillus mallei*. It is closely related to *Burkholderia pseudomallei*, the cause of melioidosis.

Species affected

Horses, donkeys and mules are the primary species affected by *B. mallei*. Carnivores, especially cats and wild species, can be infected by eating contaminated meat. Laboratory rodents such as hamsters and guinea pigs are susceptible. Pigs, sheep, and cattle are resistant, but goats and camels can be infected. Humans are also susceptible to infection.

Geographic distribution

Previously worldwide in distribution, glanders has been eradicated from many countries by testing, slaughter, and import restrictions. It is still found in some Eastern European, African, Middle Eastern, and Asian countries, as well as Mexico and South America. Cross-reactions with *B. pseudomallei* make the distribution difficult to determine accurately.

Transmission

Transmission primarily occurs by the ingestion of nasal secretions from infected animals. Sharing water and feed troughs and nuzzling can spread the organism. Inhalation and cutaneous (through open wounds) transmission rarely occurs in animals.

Incubation period

In natural infections, the incubation period can be weeks to months. Experimental infection leads to fever after 3 days and other signs within a week.

Clinical signs

The clinical signs can be nasal, cutaneous, or pulmonary, which can all be seen in the same animal. Nasal signs include a highly infective yellow-green discharge with nodules and ulcers on the nasal mucosa. The ulcers may be severe, sometimes rupturing the septum. Ulcers heal leaving a stellate scar. The regional lymph nodes are often enlarged and may rupture. In the cutaneous form (Farcy), these nodules and ulcers are seen on the skin and exude a yellow discharge. The cutaneous lymphatic vessels may fill with the purulent exudate forming firm "Farcy pipes." Signs of the pulmonary form can range from inapparent or mild dyspnea to severe coughing. Infectious nodules are formed in the lungs leading to fever, weakness, and sometimes death. Nodules can also be found in the liver, spleen, or testes. Diarrhea and polyuria are sometimes seen. Chronic infections with slow progression of signs occur most often and can persist for years. Acute infections are seen more often in donkeys and mules than in horses and

generally lead to death within a week.

Post mortem lesions

Nodular lesions can be found in the skin, nasal passages, lungs, or other internal organs. The nodules are generally 1cm in diameter, gray or white in color with a surrounding area of hyperemia and edema. The nodules may be caseous or calcified. Ulcers may be present in the skin or nasal passages and stellate scarring can be seen as these ulcers heal. Lymphadenitis may be seen in associated lymph nodes or vessels.

Morbidity and Mortality

Morbidity can be high when horses, mules and donkeys are in close contact. In China, 30% of horses were infected when large numbers of animals were gathered together in World War II. Acute infections are usually fatal within 1 to 2 weeks. Animals with the chronic form can sometimes survive for years.

Diagnosis

Clinical

Especially in endemic areas, typical nodules, ulcers and scars along with fever, weakness or respiratory difficulties may indicate glanders. Due to many inapparent and latent cases, testing is necessary to identify all infected animals.

Differential diagnosis

Differentials for glanders in Equidae include strangles, epizootic lymphangitis, ulcerative lymphangitis, melioidosis, and other causes of pneumonia, purulent sinusitis, and guttural pouch empyema. The skin lesions can be similar to dermatophilosis or dermatomycoses (i.e. sporotrichosis).

Laboratory tests

Smears from fresh exudates may reveal Gram-negative nonsporulating, nonencapsulated rods. Culture and identification can be used to confirm the diagnosis. Serological tests available include complement fixation and ELISA. These are quite sensitive and specific, except for their cross-reactivity with *B. pseudomallei*. False positives will occur in areas where melioidosis is endemic.

The mallein test can be used to identify infected animals. Mallein, a protein component of the organism, is injected into the dermis of the lower eyelid or administered in eyedrops. The protein elicits an allergic reaction in infected animals within 12-72 hours; the test is usually read at 48hrs. Mallein testing, especially repeated tests, may lead to seroconversion, causing uninfected animals to have a positive complement fixation test.

Samples to collect

Glanders is a zoonotic disease; samples should be collected and handled with all appropriate precautions. Samples should be well packaged, kept cool and labeled "Glanders suspect."

Samples should include serum, air-dried smears of exudate and sections of lesions, and including some in 10% buffered formalin.

Recommended actions if glanders is suspected

Notification of authorities

State and federal veterinarians should be notified of any suspected case of glanders. Federal: Area Veterinarians in Charge (AVICS) http://www.aphis.usda.gov/vs/area_offices.htm
State vets: <http://www.aphis.usda.gov/vs/sregs/official.html>

Quarantine and Disinfection

Burkholderia mallei is killed by direct sunlight, desiccation, and common disinfectants. The organism may live for several months in warm, moist conditions. To control the spread of disease, all contaminated bedding and food should be burned or buried, and all contact areas and objects including harnesses should be disinfected. Animals that test positive may be slaughtered. Susceptible animals should be removed for several months.

Public health

Glanders is an occupational concern for veterinarians, farriers, and other animal workers, as well as laboratory personnel. Infection with *B. mallei* is very painful and can be fatal. Humans can develop a chronic or acute form with nodules and abscessation similar to animals. Nodules may be seen on the face, legs, arms, and nasal mucosa, progressing to pyemia, metastatic pneumonia, and sometimes death. Without antibiotic treatment, disease in humans is usually fatal; untreated acute disease in humans has a 95% mortality rate within 3 weeks. With antibiotic treatment, the prognosis is much improved

For More Information

World Organization for Animal Health (OIE)
<http://www.oie.int>

OIE Manual of Standards
http://www.oie.int/eng/normes/mmanual/a_summry.htm

OIE International Animal Health Code
http://www.oie.int/eng/normes/mcode/A_summry.htm

USAHA Foreign Animal Diseases book
http://www.vet.uga.edu/vpp/gray_book/FAD/

Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/glanders_t.htm

“Glanders and Melioidosis” in eMedicine
<http://www.emedicine.com/emerg/topic884.htm>

Manual for the Recognition of Exotic Diseases of Livestock
<http://www.spc.int/rahs/>

References

Gilbert, R.O. "Glanders" In *Foreign Animal Diseases*. Richmond, VA: United States Animal Health Association, 1998, pp. 245-252.

Blue, Sky R. In *Zoonoses*. Edited by S.R. Palmer, E.J.L. Soulsby and D.I.H Simpson. New York: Oxford University Press, 1998, pp. 105-108.

"Glanders." In *Manual of Standards for Diagnostic Tests and Vaccines*. Paris: World Organization for Animal Health, 2000, pp. 576-581.